

研究论文

暗针叶林下华西箭竹 (*Fargesia nitida*) 对岷江冷杉 (*Abies faxoniana*) 幼龄植株种群动态的影响

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摘要 通过不同华西箭竹(*Fargesia nitida*)环境中岷江冷杉(*Abies faxoniana*)幼龄植株种群生命表及存活曲线、死亡曲线、消失率曲线和生存函数曲线, 分析种群动态趋势, 并根据野外取样分析华西箭竹对岷江冷杉幼龄植株生物量分配的影响。结果表明: 在暗针叶林下, 岷江冷杉幼龄植株总的种群结构呈明显的金字塔型, 存活曲线DeeveyIII型, 幼苗个体丰富, 死亡率高, 进入小树阶段后有较高的生命期望。小密度华西箭竹增大了岷江冷杉幼苗、幼树的死亡率, 该环境下的岷江冷杉幼龄植株种群存活曲线为Deevey II型, 而无竹环境为DeeveyIII型。大密度华西箭竹环境中岷江冷杉小幼苗叶重比显著增大, 异速生长显著增高。过于密集的华西箭竹严重抑制了岷江冷杉幼苗的定居, 而小密度华西箭竹的存在对岷江冷杉的更新并非完全不利。

关键词 [华西箭竹; 岷江冷杉幼龄植株; 种群动态; 生命表; 生存分析; 生物量分配](#)

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Effects of *Fargesia nitida* on the population dynamics of *Abies faxoniana* at initial stage in dark coniferous forest

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Abstract The effect of dwarf bamboo *Fargesia nitida* on the regeneration and on the dynamics of the dominant population in subalpine dark coniferous forest, *Abies faxoniana*, were analyzed in different environments of the dwarf bamboo. Three different environments of dwarf bamboo, including high density of bamboo (30-50 plants/m²) (HB), low density of bamboo (10-15 plants/m²) (LB) and without bamboo (WB), were found in the experiment site. The initial *A.faxoniana* population was classified into three categories: seedling ($H < 33\text{cm}$), sapling ($H \geq 33\text{cm}$, $D < 2.5\text{cm}$), and small tree ($2.5\text{cm} \leq D < 7.5\text{cm}$). In each stand, height, diameter at breast height (for saplings lower than 150 cm, the basal diameter was measured), and diameter of crown of each *A.faxoniana* were determined in all 5 m×5 m plots. For seedlings, only height and number were noted. We had got 103 plots in total: 38 in LB, 35 in HB and 30 in WB. It's hard to discuss the dynamics of *A.faxoniana* population in HB because of low number of individuals. Therefore three static life tables of *A.faxoniana* population at initial stage including LB, WB and all stands were worked out. The curves of their survival rate, mortality rate, disappearance rate and survival function were drawn to analyze the population dynamics. Parallel, at least three *A.faxoniana* individuals were obtained from each size class (0.1-0.3 cm, 0.3-0.6 cm, 0.6-0.9 cm and 0.9-1.1cm) in three densities of bamboo (HB, LB and WB) to analyze the biomass allocation pattern. The results were as follows: in all stands, the survival curve of the *A.faxoniana* initial population appeared to be a type of Deevey-III with an abundant seedling bank, high mortality rate in sapling stage and a higher life expectancy in small tree stage. The *A.faxoniana* initial population appeared to be a type of Deevey-II in LB, and a type of Deevey-III in WB. There was a larger seedling bank but mu

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ch lower mortality rate of seedlings in WB than those in LB. The curve of disappearance rate reached two peaks at the stage of seedling and small tree in LB, but just one at the stage of sapling in WB. During the stage from seedling to sapling, the number of *A.faxoniana* individuals was always larger in WB than those in LB, and it's reversed in the late stage of sapling. Both of the leaf weight ratio and the allometry (height / basal diameter) increased in HB. Our work shows that the *A.faxoniana* seedling establishment is prohibited intensively by a dense population of *F.nitida*, but the effect of low density of *F.nitida* may be two-sided.

Key words *Fargesia nitida* *Abies faxoniana* at initial stage population dynamics life table survival analysis biomass allocation

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